

### **REMARKS/ARGUMENTS**

These remarks are made in response to the Office Action of August 21, 2007 (Office Action). As this response is timely filed within the 3-month shortened statutory period, no fee is believed due. However, the Examiner is expressly authorized to charge any deficiencies to Deposit Account No. 50-0951.

In the Office Action, Claims 1-20 were rejected under 35 U.S.C. § 112, second paragraph. Claims 1-7, 13-19, and 20 were rejected under 35 U.S.C. § 101. Claims 2-7 and 14-19 were also rejected under 35 U.S.C. § 101. Claims 1, 3-11, 13, and 15-20 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 6,122,664 to Boukobza, *et al.* (hereinafter Boukobza). Claims 2 and 14 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Boukobza in view of "Design and Evaluation of Resource Selection Framework for Grid Application," by Ian Foster (hereinafter Foster). Claim 12 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Boukobza in view of U.S. Patent 6,681,243 to Putzolu (hereinafter Putzolu).

### **Amendments to the Claims**

Although Applicants respectfully disagree with the rejections in the Office Action, Applicants nonetheless have amended the claims in order to expedite prosecution of the present application by further emphasizing certain aspects of the claims. Applicants respectfully assert, however, that the claim amendments presented are not intended as, and should not be interpreted as, the surrender of any subject matter. Applicants are not conceding by these amendments that any previously submitted claims are unpatentable over the references of record. Applicants' present claim amendments are submitted only for purposes of facilitating expeditious prosecution of the present Application. Accordingly, Applicants respectfully reserve the right to pursue any previously submitted claims in one or more continuation and/or divisional patent applications.

In this response Applicants have amended the independent claims to emphasize certain aspects. In particular, Applicants have amended the independent claims to explicitly recite the operation of ghost agents within the grid computing environment. A ghost agent associated with a host object traverses grids of the computing environment, following the movement of the host object traversing one or more grid environments. Further, Applicants have provided further limitations to address the 35 U.S.C. § 112 and 35 U.S.C. § 101 rejections in the Office Action, as discussed below. Additionally, Claims 2-4, 9-12, and 14-19 have been amended to maintain consistency among the claims. All Amendments are fully supported throughout the Specification. No new subject matter has been introduced by these amendments.

### **Rejections Under § 112**

In the Office Action, Claims 1-20 were rejected under § 112, second paragraph, as being indefinite. In particular, the Office states on page 2 that the independent claims fail to "specify what are the comparison threshold specification that would trigger executing an operation and also doesn't close the type operation would be executed from the comparison."

In this response, the independent claims have been amended to address this issue. The claims, as amended, now recite the explicit limitation that the threshold is a maximum amount of resources that a computing resource can permit a host to use for its operations. Further, the claims also now recite the limitation that if the resources needed by the host and the associated ghost agent exceed this amount, it is determined whether to allow one or more of the ghost agent operations to be executed. However, the claims also recite that the number of operations of the ghost agent allowed are limited to an amount that will not cause the amount of resources needed by the host and the allowed ghost agent operations to exceed the maximum amount of resources allowed for a host.

Accordingly, Applicants respectfully submit that the metes and bounds for the comparison and determining steps are now well defined and respectfully request withdrawal of this rejection.

**Rejections Under § 101**

In the Office Action, Claims 1-7 and 13-20 were rejected as being directed to non-statutory subject matter. Applicants disagree. Further, Applicants respectfully submit that the claims, as amended, make any possible rejection under § 101 moot.

The claims, as amended, now recite systems and methods for restricting computing resources used by ghost agents in a grid environment. Thus, the concrete result is the restriction of resources. In particular, the claims, as amended, limit these resources by first determining the total amount of resources that would be consumed by a host and a ghost agent replicating and recording actions of a host while in a computing resource of a grid. The claims also recite that this total amount is compared to a maximum amount of computing resources the host is allowed to use. Finally, the claims recite that only a certain number of operations of the ghost agents are to be allowed, where the number is limited a number of operations that would not result in exceeding the maximum amount of resources allocated for host operations. This clearly is a concrete result.

The claims, as amended, recite features that clearly yield other concrete results as well. For example, the claims, as amended, recite that responsive to the host moving from a first grid to a second grid, the ghost agent is also moved from the first grid to the second grid, following movements of the host. In view of these concrete results, Applicants submit that rejections under § 101 are now moot and respectfully request their withdrawal.

### *Aspects of the Claims*

Prior to discussing the cited references, it may be useful to reiterate certain aspects of Applicants' claimed invention, including the functioning of the ghost software agent as the host software operates in the various grids within the grid environment. The claimed invention provides systems and methods for restricting resources consumed by ghost agents within a grid environment. For example, a method, as typified in claim 1, can include identifying a host operating in a grid of a grid environment. The ghost agent within the same grid can then be associated with the host, where the ghost agent is configured to perform operations, including replicating and recording the actions of the host. The resources consumed by the ghost agent can be restricted by comparing the total amount of resources required for operations of the host and the associated ghost agent to a threshold value. The threshold value can specify a maximum amount of resources that any host can use. If the total amount of resources needed exceeds this maximum amount, the ghost can be limited to executing only operations which will not cause the resources to be used to exceed the maximum amount. Finally, after the host moves to another grid in the grid environment, the ghost agent can be configured to automatically move to the other grid, following the host in order to replicate and record actions of the host in other grids.

### *The Claims Define Over the Cited Art*

As previously stated, independent claims 1, 8, 13, and 20 were rejected as being anticipated by Boukobza. Boukobza discloses a process for monitoring a plurality of object types of a plurality of nodes using a management node in an information system. Boukobza further discloses monitoring the various nodes by using the management node to install a single autonomous agent in a node to be monitored, where the autonomous

agent can be configured to monitor software objects, conditions, parameters, and actions in the particular node in which the agent is installed. (See, e.g., Abstract, Col. 2, Lines 21-38) The management node can then retrieve data collected by the various autonomous agents to perform further analysis of the performance of each node. (See, e.g., Col. 6, Lines 30-34). Applicants, respectfully submit that the claims, as amended define over Boukobza.

In particular, Applicants submit that Boukobza fails to disclose or suggest a ghost agent being associated with each host software object. *Boukobza instead discloses a single autonomous agent being associated with a single node, grid, or device, not a single host software object traversing the grid environment.* (See, e.g., Col. 2, lines 20-37.) The autonomous agent of Boukobza is provided to allow decentralized control of individual nodes, allowing each node to continuously and independently respond to changes in system performance and in resources without having to regularly rely on a central system or external resources. (See, e.g., Col. 2, lines 39-55). Therefore, because agents in Boukobza are limited to a single node, they cannot provide debugging for host software objects as they traverse a grid environment.

In contrast, the claimed invention provides an individual ghost agent that associates with an individual host software object, not with a node, grid, or device. Furthermore this ghost agent moves with the associated host software object and records the actions of the associated host as the host traverses the grid environment. Thus, potentially, a single ghost agent in the claimed invention can record every action of an associated host software object, regardless of which node or grid the actions of the associated host software object occur in.

Applicants also submit that Boukobza does not explicitly disclose the step of moving an associated ghost agent from a first grid to a second grid in response to moving of the host software object from the first grid to the second grid. Such a step is also not

disclosed in any other reference of record. In fact, the only reference of record to disclose any type of mobile ghost agent is Putzolu. However, Putzolu fails to disclose associating with and copying the movement of another software object, as in the amended claims. Putzolu only discloses a method of providing agents that move among network devices to manage the operation of the devices in the network. That is, Putzolu discloses that agents move in response to demands on device resources in order to travel to the appropriate network device and make any necessary adjustments to improve network performance, not for debugging host software objects. (See, e.g., col. 11, lines 49-53). Therefore, agents in Putzolu are not associated with software objects. At the most, such agents are associated with a node, as the agent can be configured to reside at a particular node according to a user command. (See, e.g., col. 5, lines 9-19). However, nowhere does Putzolu disclose that such agents can be associated with another software object or that they would follow another software object automatically. In Putzolu, movement is instead based on responding to commands or problems in the network. For example, an agent in Putzolu would not travel along with software objects arriving at a node the agent is currently at. Instead, the agent of Putzolu would travel through the grid independently, attempting to ascertain the source of software objects arriving at the node and to make any adjustments necessary to improve performance. However, such movement is independent of the subsequent destination of a software object arriving at the original node. As such, the agent of Putzolu cannot replicate and record actions for debugging purposes or otherwise, as agents and software objects do not travel together.

In contrast, a ghost agent in the claimed invention would associate with a specific object and follow the object as it leaves the node and travels to other nodes, in order to record their actions.

Therefore, Applicants respectfully submit that even if the method of Boukobza is combined with the mobile agents of Putzolu, the claims, as amended, still define over

these references. As previously stated, Boukobza is directed to continuously monitoring and evaluating individual machine or node performance using one or more autonomous agents. Putzolu is directed to managing the performance of network nodes by using agents that can travel from node to node and make needed adjustments. However, neither Putzolu nor Boukobza discloses that the agents would be bound to software objects. Allowing the autonomous agent to move from node to node, as suggested in Putzolu, only allows the agent to travel among nodes and make adjustments to devices based on current conditions of a device and network. However, such a combination still does not provide for replicating and recording actions of host software objects traversing the grid environment. This configuration provided by Applicants' invention allows, for example, debugging of a host object as it traverses the grid. Furthermore, by limiting the amount of resources the ghost agents can use, the burden on computing resources executing both host and ghost agent operations can be reduced.

Accordingly, Boukobza fails to disclose, suggest, or render obvious every feature recited in independent claims, as amended. Applicants respectfully submit, therefore, that amended independent claims each define over the references of record. Applicants further respectfully assert that whereas the remaining claims each depend from one of independent claims while reciting additional features, the remaining dependent claims likewise define over the references of record.

### **CONCLUSION**

Applicants believe that this application is now in full condition for allowance, which action is respectfully requested. Applicants request that the Examiner call the undersigned if clarification is needed on any matter within this Amendment, or if the

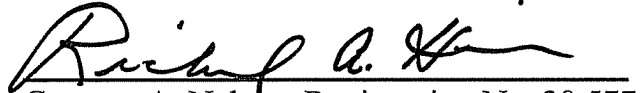
Appln No. 10/666,464  
Amendment dated November 21, 2007  
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Examiner believes a telephone interview would expedite the prosecution of the subject application to completion.

Respectfully submitted,

AKERMAN SENTERFITT

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Gregory A. Nelson, Registration No. 30,577  
Richard A. Hinson, Registration No. 47,652  
Eduardo Quinones, Registration No. 58,575  
Customer No. 40987  
Post Office Box 3188  
West Palm Beach, FL 33402-3188  
Telephone: (561) 653-5000